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Microliquid prism actuated by electrowetting DUCK-GYU LEE, JAEBUM PARK, HO-YOUNG KIM, Seoul National University — A microliquid prism is a microchannel filled with two immiscible liquids whose interface acts as a refractive surface. To steer a beam to construct optical images, the interface profile or the contact angle is modulated through electrowetting. The effective actuation of the liquid prism critically depends on the understanding of liquid flows around the moving interface. We visualize the flow field near the moving contact line formed by water, silicone oil and a glass microchannel using PIV (particle image velocimetry). The flow, which is believed to be visualized for the first time to the authors' knowledge, is clearly distinguished from that in the classical microliquid slugs in that the fluid motion near the electrowetting-driven contact line is localized in the vicinity of the contact line. We also provide a theoretical model to predict the temporal evolution of the interface profile as a function of the liquid properties and the dependency of the contact angle on voltage.

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